Amendments to the Claims

Please cancel claims 1-39 and add new claims 40-81 as follows.

40 A method of magnetron sputtering, the method comprising:

a) providing a magnetron source with a sputter surface, the magnetron source generating a magnetron magnetic field pattern along the sputter surface;

b) cyclically moving said magnetron magnetic field pattern along said sputter surface;

c) positioning a substrate to be coated a distance from and facing said sputter surface;

d) moving said substrate along said sputter surface; and

e) varying an amount of material deposited on said substrate per time unit from said magnetron source that is cyclically and phase-locked with said cyclically moving said magnetron magnetic field pattern.

41. The method of claim 40 further comprising cyclically moving said magnetron magnetic field pattern in two dimensions.

42. The method of claim 40 further comprising cyclically moving said magnetron magnetic field in at least one of a rotational pendular manner and a rotational manner with respect to an axis perpendicular to said sputter surface.

43. The method of claim 40 further comprising cyclically varying said amount of material simultaneously along the entire sputter surface.

44. The method of claim 40 further comprising varying said amount of material by varying at least one of a flow of a reactive gas and a flow of a working gas into an area between said sputter surface and said substrate.

45. The method of claim 40 further comprising varying said amount of material by controlling a power applied to said magnetron source.

46. The method of claim 40 further comprising varying said amount of material with a time course having a frequency spectrum with a significant spectral line at a double frequency of a fundamental frequency of cyclically moving said magnetron magnetic field pattern.

47. The method of claim 46 wherein said time course has a further significant spectral line at the fundamental frequency of cyclically moving said magnetron magnetic field pattern.

48. The method of claim 40 further comprising tailoring said magnetron magnetic field pattern symmetrically to an axis in a plane which is parallel to said sputter surface.

49. The method of claim 40 further comprising tailoring said magnetron magnetic field pattern symmetrically with respect to two mutually perpendicular axes in a plane which is parallel to said sputter surface.

50. The method of claim 40 further comprising applying a reactive gas into an area between said sputter surface and said substrate.

51. The method of claim 40 wherein said sputter surface comprises a circular surface.

52. The method of claim 40 further comprising not influencing a material flow distribution from said sputter surface to said substrate.

53. The method of claim 40 further comprising selecting a time course of varying said amount of material with respect to at least one of a relative movement between the substrate and the sputter surface, a shape of said magnetron magnetic field pattern, and a movement course of said magnetron magnetic field pattern.

54. The method of claim 40 further comprising time varying a course of varying said amount of material.

55. The method of claim 40 further comprising monitoring a distribution of material momentarily deposited on said substrate, comparing said monitored distribution with a desired distribution, and adjusting characteristics of varying said amount of material as a function of a difference between said desired distribution and said monitored distribution in a negative feedback control loop.

56. The method of claim 40 further comprising repeatedly moving said substrate along said sputter surface.

57. The method of claim 40 further comprising cyclically moving said substrate along said sputter surface in at least one of a single direction motion and a forth and back motion.

58. The method of claim 40 further comprising moving said substrate along said sputter surface linearly as considered in a view towards said sputter surface.

59. The method of claim 40 further comprising moving said substrate within a plane parallel to said sputter surface.

60. The method of claim 40 further comprising moving said substrate along a non-linear trajectory path as considered in a view parallel to said sputter surface.

61. The method of claim 40 further comprising moving said substrate along a non-linear path as considered in a view onto said sputter surface.

62. The method of claim 40 further comprising moving said substrate along a circular trajectory path as considered in a view towards said sputter surface about a center remote from said sputter surface.

63. The method of claim 40 further comprising superposing to said varying of said amount of material a further varying of said amount synchronized with said moving of said substrate.

64. The method of claim 40 wherein an optimized homogeneous coating thickness distribution is achieved on said substrate.

65. The method of claim 40 wherein an optimized homogeneous distribution of material stoichiometry is achieved along the coating of said substrate.

66. The method of claim 40 wherein the method of magnetron sputtering comprises a method of coating planar substrates.

67. The method of claim 40 wherein said coated substrate has a coating thickness deviation from an average coating thickness value which is less than or equal to 1% considered along a substrate surface that is greater than 1,000cm^2.

68. The method of claim 40 wherein said coated substrate has a local deviation of deposited amount of material of at most 0.01% with respect to an average value along a substrate surface of at least 10cm^2.

69. A magnetron sputtering apparatus comprising

a) a magnetron sputter source having a sputter target with a sputter surface and a magnet arrangement, said magnet arrangement being coupled to a drive to be cyclically moved along a plane parallel to said sputter surface;

b) a substrate conveyor arrangement for moving at least one substrate along said sputter surface; and

c) a modulation arrangement cyclically modulating the amount of material per time unit sputtered off said sputter surface, said modulation arrangement being phase locked with said drive.

70. The apparatus of claim 69 wherein said drive comprises one of a rotational pendular drive that generates rotational pendulum movement and a rotational drive that generates a rotational movement of said magnet arrangement with respect to an axis that is perpendicular to said sputter surface.

71. The apparatus of claim 69 wherein said modulation arrangement modulates the amount of sputtered off material per time unit simultaneously along the entire sputter surface.

72. The apparatus of claim 69 wherein said modulation arrangement comprises at least one of a reactive gas flow and a working gas flow adjusting member.

73. The apparatus of claim 69 wherein said modulation arrangement comprises an adjusting member for an electrical feed of said target.

74. The apparatus of claim 69 wherein said magnet arrangement is shaped symmetrical to an axis which is parallel to said sputter surface.

75. The apparatus of claim 69 wherein said magnet arrangement is shaped symmetrical with respect to two mutually perpendicular axes parallel to said sputter surface.

76. The apparatus of claim 69 further comprising a gas inlet that is positioned adjacent to said magnetron source, said gas inlet being connected to a gas tank arrangement comprising a reactive gas.

77. The apparatus of claim 69 wherein said target comprises a circular target.

78. The apparatus of claim 69 wherein said target is formed of a single material.

79. The apparatus of claim 69 wherein there is direct sight communication between said sputter surface and said substrate conveyor arrangement.

80. The apparatus of claim 69 further comprising a monitoring arrangement that monitors a local distribution of material deposited on a substrate at said substrate conveyor arrangement, an output of said monitoring arrangement being operationally connected to an input of a comparing unit, a second input of said comparing unit being operationally connected to an output of a setting unit, an output of said comparing unit being operationally connected to a control input of an adjusting unit of said modulation unit.

81. The apparatus of claim 69 wherein said conveyor arrangement is operationally connected to a cyclical drive.